Army Technology Enablers and Investments for New Capabilities

Presented by

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Communications-Electronics Research Development and Engineering Center

Army S&T Program

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON DC 20310-0103

SAAL-TS
MEMORANDUM FOR

MAR 05 2004

SUBJECT: Guidance for Developing Fiscal Year 2005 Science and Technology Objectives (STOs), Advanced Technology Demonstrations, and Manufacturing Technology Objectives (MTOs)

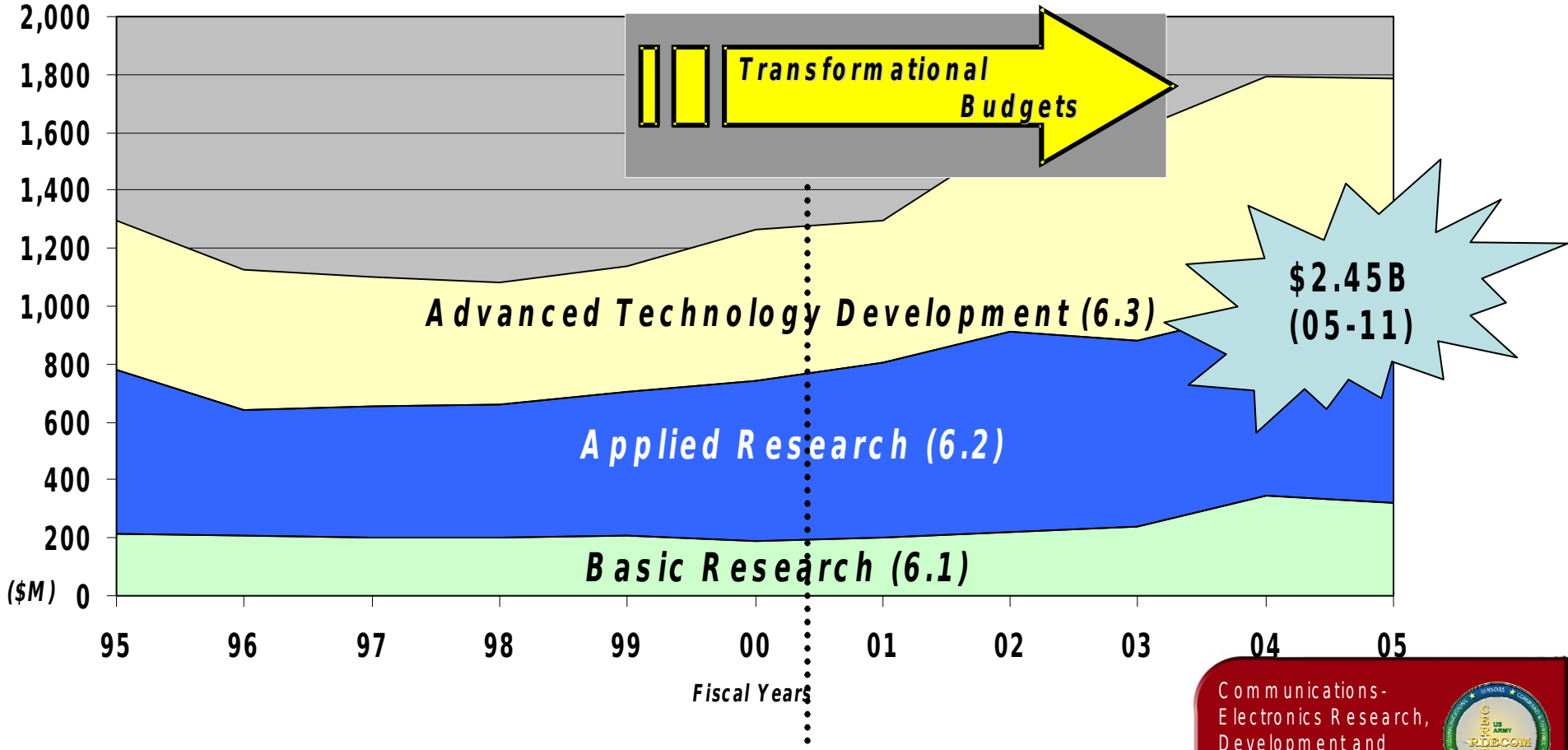
America's Army is at war.
The primary goal of the Army S&T program is to accelerate development of the key technologies that will enable transformational capabilities in the Future Force. However, we must also be alert for opportunities to field technology that enhances the capabilities of the current force in the short term.
There are specific priorities that the Acquisition Community must use to focus our efforts. First among these is the current war effort. Second is the set of the Army's 16 Focus Areas.
S&T is making impacts in many of these areas and we must continue to do so.
The Strategic Planning Guidance and Joint Programming Guidance defined by the Department of Defense set our long-range goals. This is where S&T should truly lead the way.
The results of our efforts will be the catalyst that enables transformation of today's Army into the Future Force.
These priorities must be the bedrock upon which we build the FY05 and all future S&T portfolios.
Every STO we embark upon must stem from these priorities.

Thomas H. Killion
Acting Deputy Assistant Secretary
(Research and Technology)

JAMES J. GRAZIOPLENE
Major General, GS
Director, Force Development

Army S&T Funding Trends

Presidents' Budget Requests



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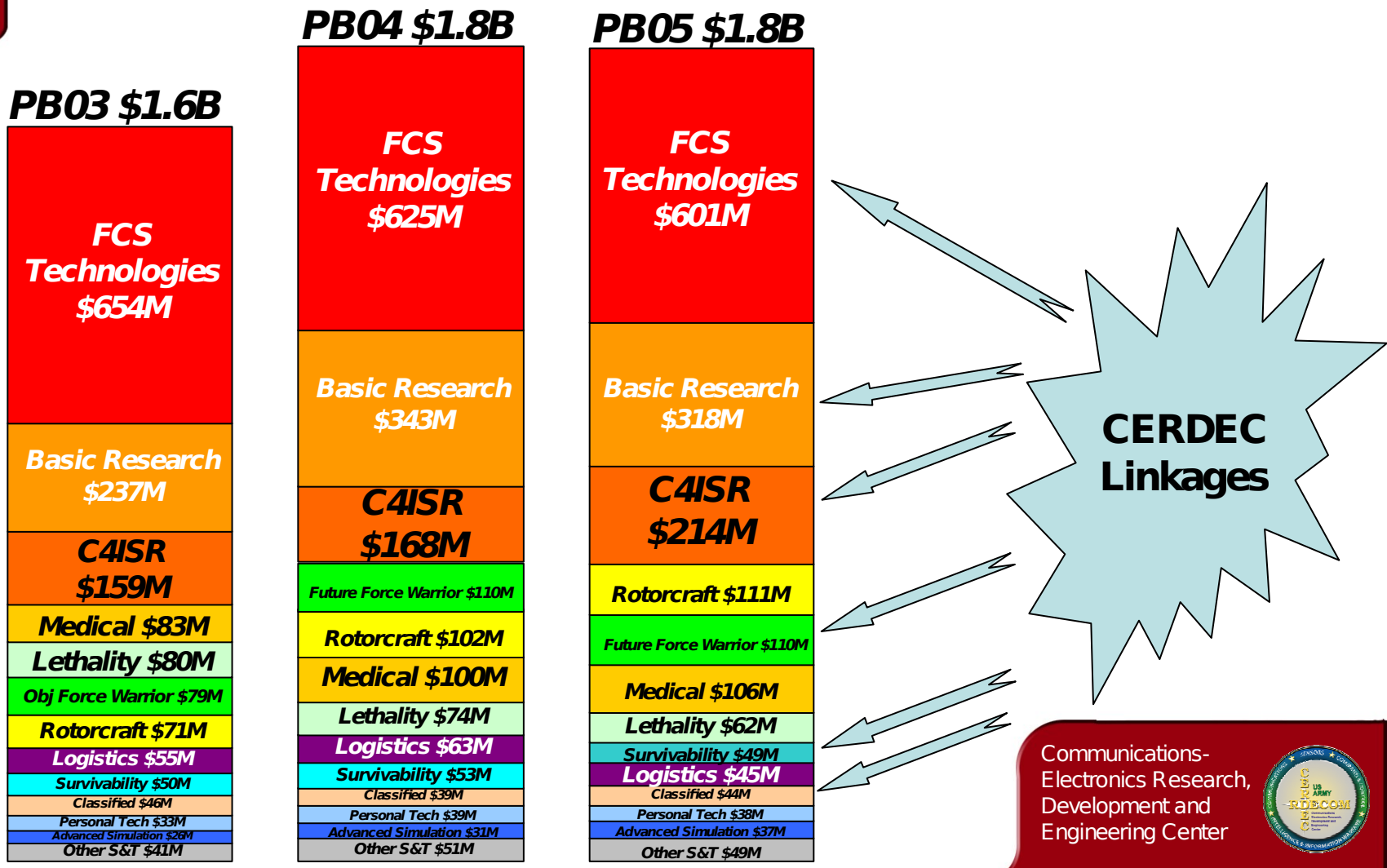
Army Science and Technology Program



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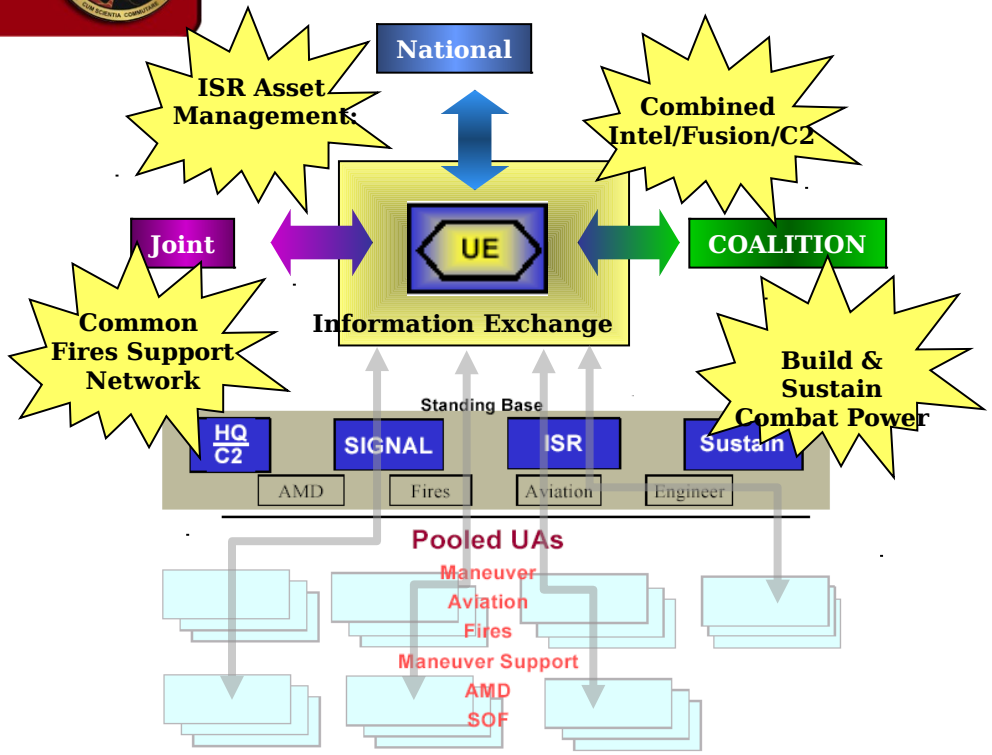
Air and Ground Operations

Purpose: Investment in This Chunk Will Provide Army Manned Aviation, Ground and Dismounted Assets Enhanced Mobility During All Weather Day and Night Operations.

Products: Over 20 prototype intensifier systems built, delivered and evaluated. Delivered a leading edge (small, high resolution) uncooled IR sensor.

Payoff: Will Significantly Improve the Aviator's Safety of Flight, Situational Awareness, and Night Pilotage Capabilities Under Adverse Weather and Mounted and Dismounted Military Operations in Urban Terrain (MOUT) Conditions.

Battle Command Construct



Purpose: This Chunk Will Provide a Seamless On-the-move Information Network From the Strategic to the Tactical Level and Is the Critical Component to Seeing, Understanding and Acting First.

Products: Communications, Intelligent Agents and Decision Aids for the One Battle Command System That Enable Commanders to Plan and Execute Their Mission.

Payoff: Integration of UA/UE/Joint/Coalition/National Information Systems, Providing Right Information at the Right Time and Right Place to Enhance Objective Force Survivability and Effectiveness.

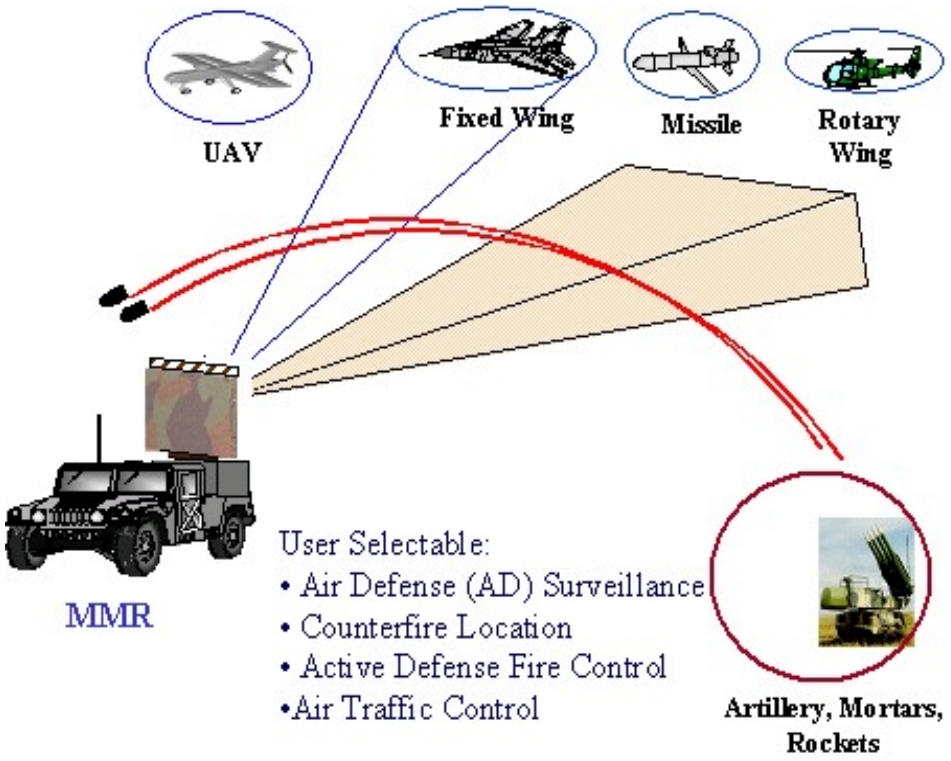
Beyond Line of Sight Lethality

Purpose: Technologies in This Chunk Will Provide the Ability to Destroy the Enemy at Longer Ranges, With Greater Precision.

Products: Target Acquisition Sensor System Demonstrating 2nd Gen IR Single Color, Shape Based AITD/R Algorithms and SWIR in a Ground to Ground Environment.

Payoff: Provides Combat Overmatch Capability to Identify Threat Targets Upon Detection Enhancing Freedom of Maneuver/Delay Enemy Freedom of Maneuver and Enhances Sensor to Shooter Linkages and Supports Layered Sensor Concept.

Non-Line of Sight Lethality

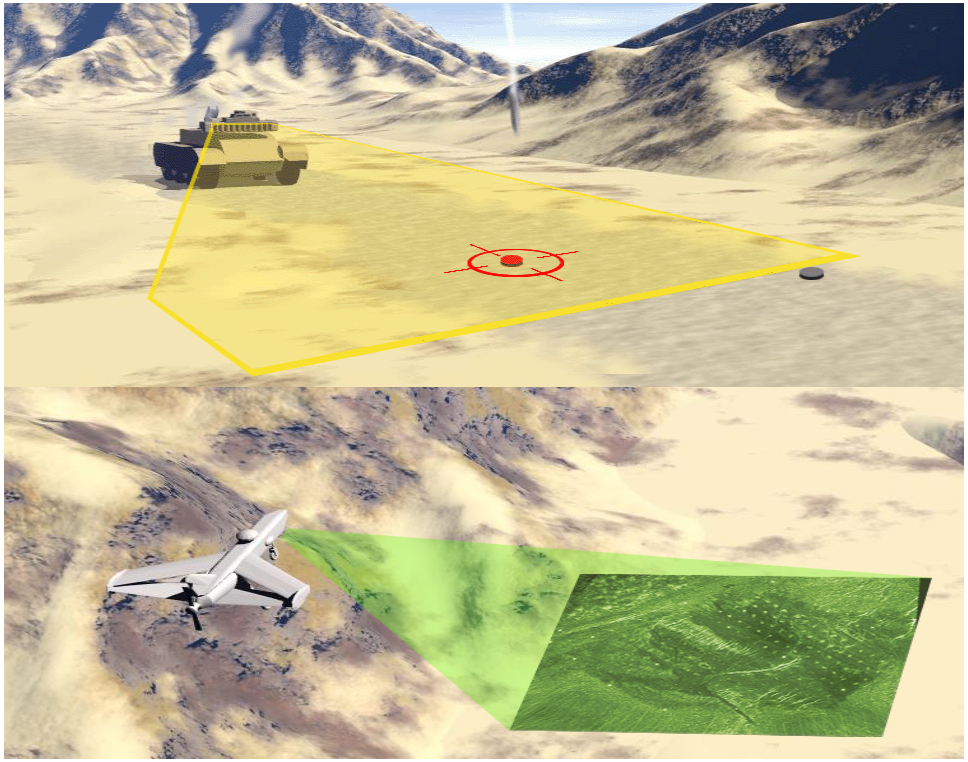


Purpose: Technologies in This Chunk Will Provide A Single System Capable of Multiple Ground-based Radar Missions (Air Defense, Field Artillery/Mortars/Rockets Weapon Location, Fire Control and Air Traffic Control.

Products: Fully Tested Multi-mission Radar System Demonstrator And Man-portable Short Range Counter Mortar Radar (LCMR)

Payoff: Support Early Entry Forces With Single, Rapidly Deployable Sensor; Address Air and Missile Defense, ATC and Counter Fire Requirements Simultaneously Thus Improving Force Lethality and Situational Awareness; Reduced Logistic Support by a Single Radar That Replaces Four Different Radar Systems

Maneuver Support

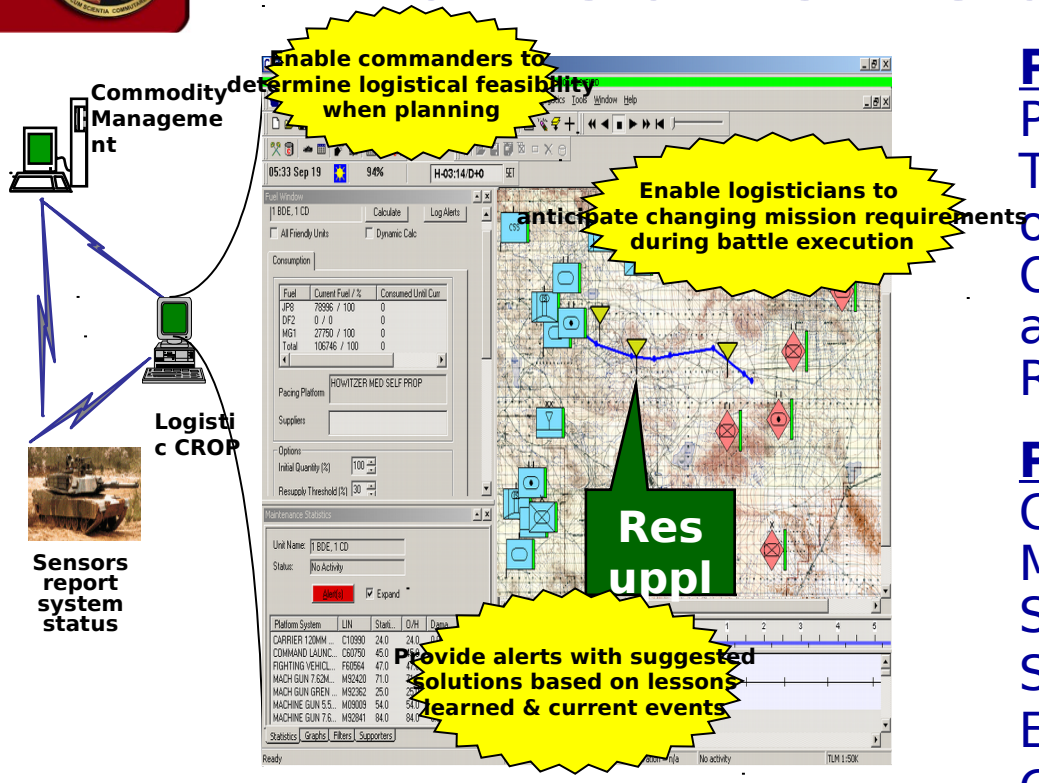


Purpose: Provide the Ability to Detect, Neutralize and Digitally Disseminate Mine and Minefield Locations.

Products: Detection Sensors, Software Algorithms, and Neutralization Techniques to Support Rate of Advance and Maneuverability Requirements on and Off-road.

Payoff: Increased Vehicle and Soldier Survivability. Provides Increases in Rates-of-advance for Route Clearance and Minefield Reconnaissance Missions. Provides Bolt-on Operations Without Overpass Avoiding the Need for Specialized Vehicles.

Maneuver Sustainment

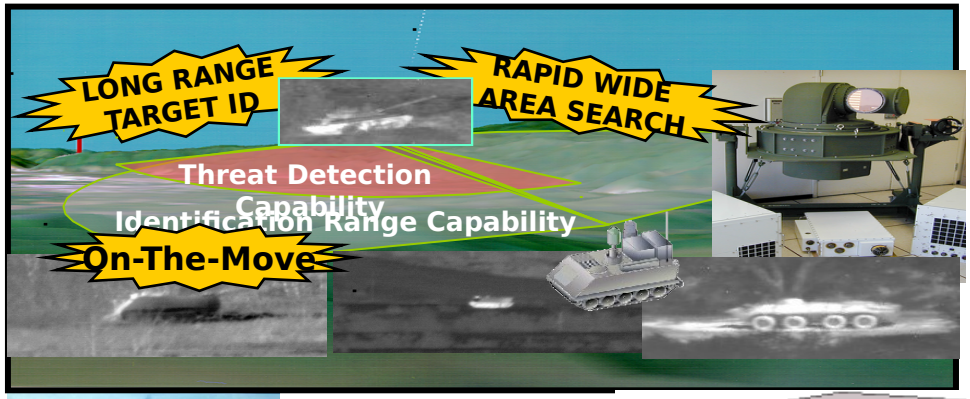

Enable commanders to determine logistical feasibility when planning
Commodity Management
Enable logisticians to anticipate changing mission requirements during battle execution
Logistic CROP
Sensors report system status
Res uppl
Provide alerts with suggested solutions based on lessons learned & current events

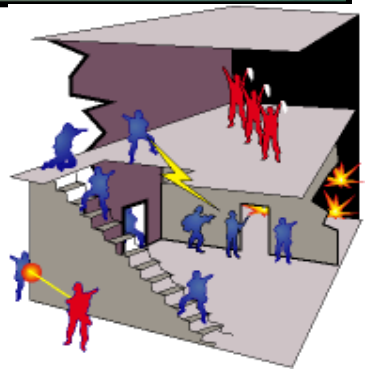
Purpose: This Chunk Will Provide Means to Manage the Transportation and Sustainment of Personnel and Materiel in Order to Support High OPTEMPO and Ready to Fight Requirements.

Products: Planning Tools for COA Analysis of Classes III, V, Maintenance, and Medical Service;
Software Intelligent Agents for Execution Monitoring and Counteraction Recommendation;
Sustainment Focused Computer Based Training Tools

Payoff: Sustainment Analysis and Planning Integrated and Concurrent With Maneuver COA

Mounted/Dismounted Maneuver





Purpose: This Chunk Will Provide Unsurpassed_Mobility Over Operational Distances As an Integrated Combined Arms Unit. This Capability Is Necessary If Commanders Are to Maneuver Where and When They Desire, Without Interruption or Delay in Intent.

Products: Multi-spectral AiTD and MWIR AiTD/AiTR System for Evaluation in a Field Demo; Demonstration and Validation of Both Operational and Training Pos/Nav & Tracking Breadboards in a MOUT Environment

Payoff: Superior Tactical Maneuverability in All Terrain and Weather As a Dismounted and Mounted Combined Arms Force.

Sensor Fusion

Purpose: Provide Multi-spectral, Multi-discipline Sensors and Fusion Tools Required to Understand the Enemy Situation and the Battlespace Environment As Required for the Unit of Action.

Products: Software for Knowledge Generation and Explanation to Answer Warfighting CCIR's in a Timely Manner; Ontology Based Information Agents for Objective Force Systems (FCS, DCGS-A, C2 Systems); Battle Damage Assessment Agents, and User-directed Knowledge Discovery Tools

Payoff: The Ability to Make Quick War-fighting Decisions After Having Fully Leveraged the Huge Volumes of Information That the UoA Will Receive.

Survivability

Purpose: Provide the Warfighter Affordable Aircraft and Ground Electronic Sensors and Systems Which Enhance Survivability and Lethality Through the Development of Technology to Avoid Acquisition and Avoid Being Hit.

Products: Warning Sensors to Cue EW and APS Countermeasure Systems; Electronic Countermeasure Systems and Techniques to Neutralize Smart Munitions; Detection, Location, Identification, Jamming and Deception of Enemy Battlefield Surveillance and Targeting Radar Systems.

Payoff: Survivability and Information Dominance Through Degradation, Denial, and Deception of Enemy Sensors and Remotely Controlled Weapon Systems

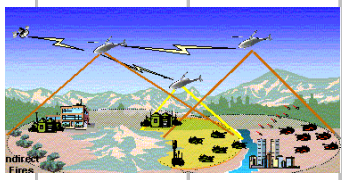
C4 Technology

FY03 FY04 FY05 FY06 FY07 FY08 FY09 FY10 FY11 FY12

C3 OTM Demos

AJCN ACTD

Multi-Mission Comms/ SIGINT Payload

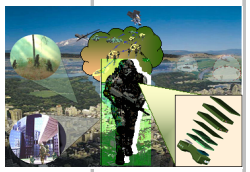


Command and Control OTM

Agile Commander

Execution-Centric Decision Support

Distributed Battle Command OTM



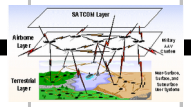
JTRS Squad-Level Communications

SUO/SAS Squad Radio Development for OFW

MARCONI

DIRECTIONAL NETWORK

Networking



Mobile Intelligent agents in Wireless network.

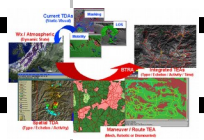
Advanced Antennas

Ka Band Phased Array Antennas

C2 Software

Intelligent information push/pull to soldier for SA and control of mixed assets

Terrain Awareness



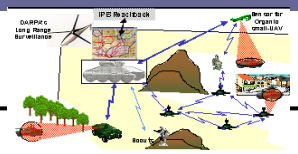
Effects of terrain and weather on force/threat behavior

FCS Increment 1.0 | **FCS Increment 2.0** | **FCS Increment 3.0**

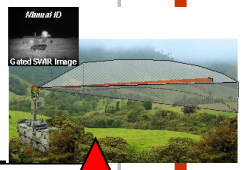
ISR Technology

FY03 FY04 FY05 FY06 FY07 FY08 FY09 FY10 FY11 FY12

Networked Sensors for the Future Force

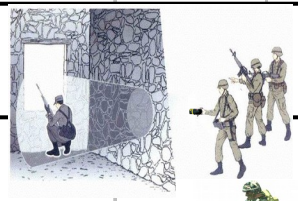


Target Acquisition Sensor Suite



Disposable Sensor Networks

Sense Through the Wall Systems



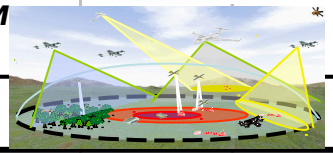
UAV MEPs

Shadow 200

OAV-L, OAV-M

A-160 Hummingbird

Eye In the Sky



Focal Plane Arrays

50 grams/1 inch³ Camera 120x160

Field testing of mega pixel Multi-spectral Arrays

Signal Processing ATR

Aided Target Detection Demonstration (Varied Background, Clutter and Temp Conditions)

Sensor Correlation and Fusion

Cross-source retrieval with automated search

Fusion Based Knowledge

FCS Increment I MS B | **FCS Increment II MS B** | **FCS Increment III MS B**

Communication Technology Research Program

Battle Command FOC:
- FF Worldwide NLOS BCOTM
- FF Communications Modeling Tools

Mounted/Dismounted Maneuver:
- Dismounted Soldier Communications

Significant Related Programs

	RDECOM - STOs															DARPA								DOE				
	C2 in Complex & Urban Terrain	Sensor Optoelectronic	Situational Understanding for UoA Maneuver Team Soldiers	JTRS SLICE	SATCOM OTM	MOSAIC ATD	Adv Antenna	NSFF	AJCN	DRAMA	MARCON-i	TWNA	FOCUS	RETNA	COMPOSER	Oasis	Dynamic Coalitions	Fault TOL Net	FCS-C	ORACLE	DRAFT	NETEX	XG	Agent Aided C4ISR	M&S Secure Wireless Comms	Net Int Sim Sys	Antennas	SATCOM OTM
Connectivity	●		●	●	●	○	●	●	●	●	●			●	●		●	○	○		●	●	●	●	●		●	●
Capacity		●		●	○	●	○				●		●	○					●	●				○					
Network Security				○		○		○				●				●		●									●		

Bold = Focus area

● **Primary Focus Area**
○ **Secondary Focus Area**

C2 Technology Research Program

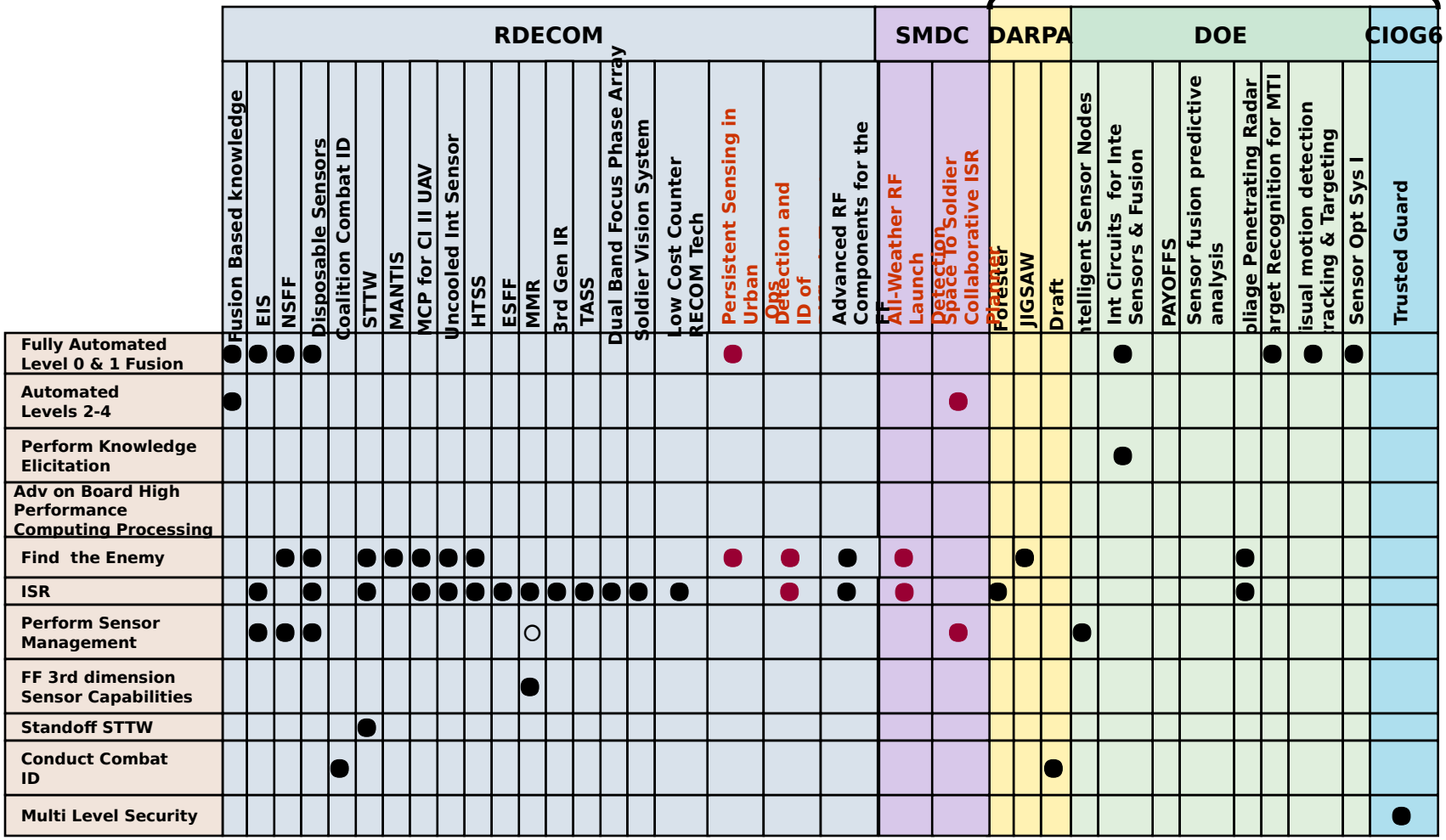
Significant Related Programs

	RDECOM													DARPA					DOE																							
	AGILE COMMANDER	SATCOM OTM	DRAMA	ADV POS ANV	MFLT-STS	COMPOSER	BIKE	C²ORE	NSFF	JTRS-SLICE	FLEXIBLE DISPLAY	RETNA	C2 in Complex & Urban Terrain	CPOF	FCS-C2	FAULT TOL NET	FCS-C	XG	COGNITION MODELS FOR EACH SO	FORCE MULTI C2 OF MULTIPLE UNMANNED ASSETS	WEATHER EFFECTS FOR WARFIGHTER	COP-1A	COP INTELLIGENCE SHARING COLAB AGENTS	COP INTELLIGENCE SHARING COLAB AGENTS	C--SYS TO COMMAND MIL DESIGN MAKING C2	EMBODIED CONVEL AGENTS IS PREDICTABLE ASSISTANTS	BATTLEFIELD RISK MONITOR	RISK MITIGATION & C2 BFA CAPABILITY STUDY	FCS AGENT TECH PUBLISH	V&V IA Tech Performance in support of it COT	R3ISS
FF Decision Making Models						●		●	●				●						●																					
FF Predictive Analysis Tools	●					●	●								●					●		●			●	●	●	●											
FF COP Visualization	●		●			●	○				●		●	●	○							●																		
FF JIM Interoperability		●					●					●						●																						
Alternative to GPS				●						●																														
Automated 2-Way Language Translation					●																																			
Effects Based Info Operations							●																																	

Bold = Focus area

● Primary Focus Area
○ Secondary Focus Area

Fusion Technology Research Program



Summary

- Number of Shortfalls Appear to Be Under Invested
  - Network Security
  - Alternative Navigation Technologies
  - Natural Language Translation
  - Automated Level 2-4 Fusion
  - Perform Knowledge Elicitation
- We Will Continue to Develop and Transition Technologies That Support the GWOT While Successfully Delivering Critical Technologies to the Transformational Programs